UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,947	11/26/2003	Jorge Dubcovsky	514112000320	4243

20872 7590 04/05/2006

MORRISON & FOERSTER LLP
425 MARKET STREET
SAN FRANCISCO, CA 94105-2482

EXAMINER	
BAUM, STUART F	

ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/723,947	DUBCOVSKY ET AL.	
	Examiner	Art Unit	
	Stuart F. Baum	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) *28-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27 and 34-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/23/05, 1/20/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-36 are pending.

2. Applicant's election with traverse of Group I, claims 1-27 in the reply filed on 2/3/2006 is acknowledged. The traversal is on the ground(s) that it would not be an undue burden for the Examiner to search on the subject matter covered by all the claims (page 7 or Remarks, 9th paragraph).

This is not found persuasive because while the search of the prior art for one group may overlap with that of another, they are not co-extensive of each other and thus would be a burden on the Office.

The requirement is still deemed proper and is therefore made FINAL.

Claims 34-36 have been newly added.

Claims 28-33 are withdrawn from consideration for being drawn to non-elected inventions.

3. Claims 1-27 and 34-36 including SEQ ID NO:75 are examined in the present office action.

Information Disclosure Statement

4. Only the titles listed in the International Search Report have been considered. The recitation "International Search Report ..." is not appropriate for printing on the front of a patent.

Brief Description of the Drawings

5. The Specification is objected to because the drawings are not referred to properly. If the drawings show Figures 2A and 2B or Figure 2 "a" and "b", then the Brief Description of the Drawings should recite "Figures 2A-2B", instead of "Figure 2". Correction is requested.

Specification

6. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See for example page 81, second full paragraph. See MPEP § 608.01.

New Matter

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-27 and 34-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims have been amended to recite "an isolated nucleic acid that encodes a polypeptide having at least 90%, 92% or 95% identity to the polypeptide encoded by SEQ ID NO:75" or "wherein said nucleic acid encodes the polypeptide encoded by SEQ ID NO:75". Applicants fail to point to support for the phrase in the instant specification. Upon a cursory search of the specification, support could not be found. Applicants are required to point to support for "an isolated nucleic acid that encodes a polypeptide having at least 90%, 92% or 95% identity to the polypeptide encoded by SEQ ID NO:75" and "wherein said nucleic acid encodes the polypeptide encoded by SEQ ID NO:75" or to amend the claims to delete the NEW MATTER.

Written Description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-27 and 34-35 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to an isolated nucleic acid that encodes a polypeptide having at least 90%, 92% or 95% identity to the polypeptide encoded by SEQ ID NO:75; or wherein the isolated nucleic acid is operably linked to a promoter, or a vector, cell, or transgenic plant

comprising said nucleic acid; or method for altering a plant's response to vernalization comprising transforming a plant or plant tissue with said isolated nucleic acid.

Applicants disclose that in a previous study, the wheat vernalization gene VRN2 was mapped to the long arm of chromosome 5A using a segregating population from the cross between *Triticum monococcum* DV92 (*vrn1vrn2*, spring) and G3116 (*vrn1Vrn2*, winter) (page 70, 2nd full paragraph). Applicants cloned the VRN2 gene and renamed it as ZCCT1 whose sequence is set forth in SEQ ID NO:75 (page 24, 2nd full paragraph; page 12, and sequence listing). Applicants disclose the name, ZCCT1, is based on the presence of a putative zinc finger in the first exon and a CCT domain in the second exon. The CCT domain was named after CO, CO-like, and TOC1 (page 73, 3rd full paragraph). Applicants disclose the name "VRN" is not the VRN gene from Arabidopsis (page 47, 4th paragraph).

The Applicants do not identify essential regions of ZCCT1 protein encoded by SEQ ID NO:75, nor do Applicants describe any polynucleotide sequences that encode a protein having at least 90% identity to the protein encoded by SEQ ID NO:75 and encode a functional ZCCT1 protein.

The Federal Circuit has recently clarified the application of the written description requirement to inventions in the field of biotechnology. See University of California v. Eli Lilly and Co., 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). In summary, the court stated that a written description of an invention requires a precise definition, one that defines the structural features of the chemical genus that distinguishes it from other chemical structures. A definition by function does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is. The court goes on to say, "A description of a genus of

cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus." *See University of California v. Eli Lilly and Co.*, 119 F.3d 1559; 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

Applicants fail to describe a representative number of polynucleotide sequences encoding a ZCCT1 protein falling within the scope of the claimed genus of polynucleotides which have at least 90% identity to the protein encoded by SEQ ID NO:75. Applicants only describe a single cDNA sequence of SEQ ID NO:75. Furthermore, Applicants fail to describe structural features common to members of the claimed genus of polynucleotides. Hence, Applicants fail to meet either prong of the two-prong test set forth by *Eli Lilly*. Furthermore, given the lack of description of the necessary elements essential for the ZCCT1 protein, it remains unclear what features identify *T. monococcum* DV92 protein. Since the genus of ZCCT1 proteins has not been described by specific structural features, the specification fails to provide an adequate written description to support the breath of the claims.

Sequences that have at least 90% identity to the protein encoded by SEQ ID NO:75 encompass naturally occurring allelic variants, mutants of ZCCT1 protein, as well as sequences encoding proteins having no known ZCCT1 activity, of which Applicant is not in possession. Absent of such disclosure, one skilled in the art cannot determine the genus of sequences based upon the disclosure of the sequence of SEQ ID NO:75 with any certainty or predictability. Accordingly, the specification fails to provide an adequate written description to support the hybridization language or percent identity language as set forth in the claims. (See Written

Description guidelines published in Federal Register/Vol. 66, No.4/Friday, January 5, 2001/Notices: p.1099-1111).

Enablement

9. Claims 1-27 and 34-36 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claimed invention is not supported by an enabling disclosure taking into account the *Wands* factors. *In re Wands,* 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claim.

The claims are drawn to an isolated nucleic acid that encodes a polypeptide having at least 90%, 92% or 95% identity to the polypeptide encoded by SEQ ID NO:75; or wherein the isolated nucleic acid is operably linked to a promoter, or a vector, cell, or transgenic plant comprising said nucleic acid; or method for altering a plant's response to vernalization comprising transforming a plant or plant tissue with said isolated nucleic acid.

Applicants disclose that in a previous study, the wheat vernalization gene VRN2 was mapped to the long arm of chromosome 5A using a segregating population from the cross between *Triticum monococcum* DV92 (*vrn1vrn2*, spring) and G3116 (*vrn1Vrn2*, winter) (page 70, 2nd full paragraph). Applicants cloned the VRN2 gene and renamed it as ZCCT1 whose sequence is set forth in SEQ ID NO:75 (page 24, 2nd full paragraph; page 12, and sequence listing). Applicants disclose the name, ZCCT1, is based on the presence of a putative zinc finger in the first exon and a CCT domain in the second exon. The CCT domain was named after **C**O, **C**O-like, and **T**OC1 (page 73, 3rd full paragraph). Applicants disclose the name "VRN" is not the VRN gene from Arabidopsis (page 47, 4th paragraph).

Applicants have not reduced to practice the invention. The specification fails to provide guidance for one of skill in the art how to make and/or use the claimed invention. Applicants have not transformed a wild-type plant with any of the claimed sequences, so that the introduced sequence is ectopically expressed to produce a plant with an altered vernalization phenotype. Applicants have only taught the cloning of the VRN2/ZCCT1 gene whose nucleic acid sequence is set forth in SEQ ID NO:75 (page 83, 1st full paragraph and see above). Applicants have not taught how one skilled in the art can use the claimed sequences to generate a plant with an altered vernalisation phenotype, without having to do additional undue experimentation in order to achieve the desired results. In addition, Applicants have not taught how one skilled in the art would use a plant transformed with any of the claimed sequences.

Applicants have not provided examples or guidance for selecting a sequence out of the multitude of sequences that are encompassed by Applicant's broad claim language, that gives the expected results when transformed into a plant. Transforming plants with heterologous genes

that are involved in plant development produce unpredictable results. Kano-Murakami et al (1993, FEBS 334:365-368) teach introducing the *Oryza sativa* homeobox 1 (OSH1) gene into tobacco. OSH1 is a rice homologue of the *Knotted-1* homeobox gene from maize and would be encompassed by Applicant's broad claim language. Kano-Murakami et al teach transgenic tobacco plants comprising the OSH1 gene display a "range of phenotypes which include abnormalities in leaf and petal shape as well as stem height and number" (page 365, right column, 1st paragraph).

The state-of-the-art is such that one of skill in the art cannot predict which nucleic acids that encode a protein having at least 90% sequence identity to the polypeptide encoded by SEQ ID NO:75, will encode a protein with the same activity as the protein encoded by SEQ ID NO:75. The prediction of protein structure from sequence data and, in turn, utilizing predicted structural determinations to ascertain functional aspects of the protein, is extremely complex, and the positions within the protein's sequence where amino acid substitutions can be made with a reasonable expectation of maintaining function are limited (Bowie et al, Science 247:1306-1310, 1990, see especially page 1306). Proteins may be sensitive to alterations in even a single amino acid in a sequence. For example, the replacement of a glycine residue located within the START domain of either the PHABULOSA or PHAVOLUTA protein receptor with either an alanine or aspartic acid residue, alters the sterol/lipid binding domain (McConnell et al, Nature 411 (6838):709-713, 2001, see especially page 710, left column, 2nd paragraph).

Applicants have not disclosed how one makes or isolates any of the sequences that are encompassed by Applicants' broad claims. Applicants have not taught which regions of the

respective polynucleotides can be used to amplify any of said polynucleotides or which regions can be used as a probe to isolate any of said polynucleotide sequences.

In the absence of guidance, undue trial and error experimentation would be required for one of ordinary skill in the art to screen through the multitude of non-exemplified sequences, either by using non-disclosed fragments of SEQ ID NO:75 as probes or by designing primers to undisclosed regions of SEQ ID NO:75 and isolating or amplifying fragments, subcloning the fragments, producing expression vectors and transforming plants therewith, in order to identify those, if any, that when over-expressed produce a plant with an altered response to vernalization and encode a protein that has at least 90% identity to the polypeptide encoded by SEQ ID NO:75.

Therefore, given the breadth of the claims; the lack of guidance and examples; the unpredictability in the art; and the state-of-the-art as discussed above, undue experimentation would be required to practice the claimed invention, and therefore the invention is not enabled.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 19, 21, and 23 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 19, 21, and 23 are drawn to a seed of the transformed plant. Due to Mendelian inheritance of genes, a single gene introduced into a parent plant would only be transferred at most to half the male gametes and half the female gametes. This translates into only three

quarters of the progeny having at least a single copy of the transgene and one quarter of the progeny would not carry a copy of the transgene. Given that there is no indication that there would be any other distinguishable characteristics of the claimed seeds, it is unclear whether the claimed seeds would be distinguishable from seeds that would occur in nature. See *Diamond v. Chakrabarty*, 447 U.S. 303 (1980), *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 76 USPQ 280 (1948), and *In re Bergy , Coats, and Malik* 195 USPQ 344, (CCPA) 1977. The amendment of the claims to recite that the seeds comprise the construct that was introduced into the parent would overcome the rejection.

11. Claims 11-13 are rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

The claims recites "A cell comprising" which reads on a human being. Amending the claim to recite "An isolated cell" will obviate the rejection.

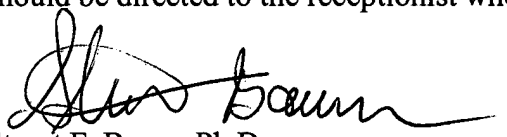
12. Claims 1-27 and 34-36 are deemed free of the prior art, given the failure of the prior art to teach or reasonably suggest an isolated polynucleotide of SEQ ID NO:75, or isolated polynucleotide encoding a protein having at least 90%, 92% or 95% identity to the polypeptide encoded by SEQ ID NO:75, vector, cell, transgenic plant and method, all of which comprising said polynucleotide.

13. No claims are allowed

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached at 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.



Stuart F. Baum Ph.D.
Patent Examiner
Art Unit 1638
March 31, 2006

STUART F. BAUM, PH.D.
PATENT EXAMINER